



## APPENDIX 9

Preliminary Amendment in Continuation Application  
U.S. Serial No.09/288,943 filed April 09, 1999.

**RECEIVED**

**MAY 29 2003**

**TECHNOLOGY CENTER R3700**

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re prior application of: Steve Ingistov

Prior Serial No. : 08/892,738

Filed: July 15, 1997

Group Art Unit: 3401

Examiner: J. Kwon

Title : TURBINE POWER PLANT HAVING MINIMAL-CONTACT BRUSH  
SEAL AUGMENTED LABYRINTH SEAL

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

The following Preliminary Amendment is submitted in the subject application.

IN THE SPECIFICATION

At page 1, the first line in the third paragraph is amended to read "Leakage in excess [if] of a predetermined amount that".

At page 2, in the second line, the word "due" is added after the word "seal".

At page 8, in the fifth and seventh lines, the numeral "18" is changed to be the numeral "24".  
The eighteenth line is revised to read as follows: "32 that also supports a final stator member [34]  
17S of the".

At page 9, in the fourth and fifth lines from the bottom of the page, the numeral "40" is deleted.

On page 10, in line 2, the numeral "24" is changed to the numeral "42". In the second line of the paragraph beginning near the top of page 10, the numeral "40" is deleted; and in the eleventh line from the bottom of the page, the numeral "40" is deleted.

On page 12, in the fifth and sixth lines of the paragraph beginning near the top of page 12, the numeral "70" is deleted; and in the eighth line from the bottom of the page, the numeral "40" is deleted.

On page 13, in the seventh line, after the word "that", the article "a" is added.

#### IN THE CLAIMS

Please cancel Claims 1-20.

Please add new Claims 21-31 as follows.

21. A stationary gas turbine engine for a power plant, comprising:

- (a) a multistage axial compressor, the compressor having a rotor, the rotor having a cylindrical land region downstream of a last-stage of the compressor, the land region having an outside diameter D;
- (b) a turbine shaft-coupled to the rotor of the compressor;
- (c) a combustor fluid coupled between the compressor and the turbine;
- (d) a stationary inner barrel member downstream of the compressor, air flowing from the compressor to the combustor passing outside of the inner barrel member, a chamber within the inner barrel member forming a main passage and containing a labyrinth seal comprising at least one knife-edge member positioned on the barrel member for controlling air leakage through the labyrinth for cooling air from the compressor, the cooling air flowing from the chamber and being mixed with combustion gases upstream of the turbine; and
- (e) a brush seal positioned on the barrel member and upstream from the labyrinth seal for restricting air passage into the chamber from the compressor, the brush seal comprising:
  - (i) a ring-shaped holder;

(ii) a multiplicity of bristle members extending radially inwardly from the holder toward the land region of the rotor, outer extremities of the bristle members being rigidly retained relative to the holder; and

(iii) the holder being fastened to the inner barrel member, wherein, when the power plant is inactive, the bristles have an ambient temperature clearance of not less than 0.015 percent of the diameter D from the land region of the rotor and whereby air flow into the compressor is impeded.

22. The engine of Claim 21, further comprising a barrel passage extending through one wall of the inner barrel for passing air therethrough downstream of the brush seal, thereby altering the flow of cooling air from the chamber to be mixed with the combustion gases upstream of the turbine.

23. The engine of Claim 22, further comprising a structure for restricting the barrel passage.

24. The engine of Claim 21, further comprising an insert ring connecting segments of the inner barrel member, the insert ring being located proximate the land region of the rotor, the holder being fastened to the insert ring by a plurality of threaded fasteners.

25. The engine of Claim 24, wherein the brush seal, including the holder thereof is segmented for facilitating assembly with the insert ring.

26. In a turbine power plant having a multistage axial compressor, a turbine shaft-coupled to a rotor of the compressor, a combustor fluid-coupled between the compressor and the turbine, and a labyrinth seal between the rotor and a stationary inner barrel member, the rotor having a cylindrical land region of diameter D, the improvement comprising a brush seal connected to the inner barrel

and augmenting the labyrinth seal, being fluid connected in series therewith, the brush seal comprising:

- (a) a ring-shaped holder;
- (b) a multiplicity of bristle members extending radially inwardly from the holder toward the land region of the rotor, outer extremities of the bristle members being rigidly retained relative to the holder; and
- (c) the holder being fastened to the inner barrel member,  
wherein, when the power plant is inactive, the bristles have an ambient temperature clearance of not less than 0.015 percent of the diameter D from the land region of the rotor.

27. A method for controlling cooling air flow in a turbine power plant having a multistage axial compressor, a turbine shaft-coupled to a rotor of the compressor, a combustor fluid-coupled between the compressor and the turbine, and a labyrinth seal between the rotor and a stationary inner barrel member, the rotor having a cylindrical land region of diameter D, comprising the steps of:

- (a) providing a brush seal having a ring-shaped holder, a multiplicity of bristle members extending radially inwardly from the holder toward the land region of the rotor, outer extremities of the bristle members being rigidly retained relative to the holder;
- (b) connecting the brush seal in augmenting relation to the labyrinth seal; and
- (c) spacing the bristle members from the land region of the rotor by an ambient temperature clearance of not less than 0.015 percent of the diameter D when the power plant is inactive.

28. The method of Claim 27, wherein the power plant includes an insert ring fastened to the inner barrel member in axially spaced relation to a portion of the rotor member, the method comprising the further steps of:

- (a) removing the insert ring from the inner barrel member;
- (b) providing an adapter ring;

- (c) mounting the brush seal to the adapter ring; and
- (d) fastening the adapter ring to the inner barrel member in place of the insert ring.

29. The method of Claim 28, wherein the step of providing the adapter ring comprises the step of modifying the insert ring.

30. The engine of Claim 22, wherein the barrel passage is one of a plurality of barrel passages.

- cancel*
- 31. A method for generating electrical power comprising the steps of:
    - (a) providing the improved power plant of Claim 11; and
    - (b) monitoring an operating parameter of the power plant.

Please add new Claims 32-40 as follows.

---

32. A refurbished gas turbine engine component having at least one knife edge seal for inhibiting air leakage through an intercomponent gap between the component and a second component, the refurbished component characterized by:

a brush seal mounted on the refurbished component in tandem with the knife edge seal, the bristles of the brush seal extending toward the second component for impeding the leakage of air through the intercomponent gap.

33. The refurbished component of Claim 32 characterized in that the component comprises two component segments, the brush seal is also segmented and the brush seal segments are mounted in a circumferentially extending groove so that the seal is installable and removable by

separating the component segments and sliding the brush seal segments circumferentially in the groove.

34. A method of improving the air sealing effectiveness between a rotating component and a nonrotating component in a turbine engine, the rotating and nonrotating components being separated by a gap with knife edge seals extending across the gap to inhibit leakage of air therethrough, the method characterized by:

providing a brush seal;

reconfiguring the nonrotating component to provide means for receiving and retaining the brush seal in tandem with the knife edge seals; and

installing the brush seal so that the seal bristles extend toward the rotating component to impede the flow of air through the gap, the brush seal being retained by the receiving and retaining means.

35. The method of Claim 34 wherein the nonrotating component is hollow and substantially cylindrical and has a wall thickness and a face, the method characterized in that the step of reconfiguring the nonrotating component includes:

creating a capture slot in the faced of the nonrotating component for radially retaining the brush seal; and

attaching a retainer to the nonrotating component so that the retainer cooperates with the face to axially trap the brush seal.

36. The method of Claim 35 characterized in that the reconfiguring step includes reducing the wall thickness by a predefined amount in the vicinity of the face to form a seal seat and accommodate the radial dimension of the brush seal.

37. The method of Claim 35 characterized in that the reconfiguring step regulates the axial length of the nonrotating component.

38. The method of Claim 34 wherein the brush seal is a multilayered brush seal.

39. The method of Claim 34 wherein the nonrotating component comprises upper and lower component segments each component segment subtending approximately 180 degrees of arc, and the brush seal comprises an upper brush seal segment subtending approximately 180 degrees of arc and one or more lower brush seal segments, the lower brush seal segments collectively subtending approximately 180 degrees of arc.

40. A method of improving the air sealing effectiveness between a rotating component and a nonrotating component in a turbine engine, the nonrotating component being hollow and substantially cylindrical and having a wall thickness and a face, the rotating and nonrotating components being separated by a gap with knife edge seals extending across the gap to inhibit leakage of air therethrough, the method characterized by:

reconfiguring the nonrotating component by reducing its axial length by a predetermined amount and reducing its wall thickness in the vicinity of the face by a predefined amount whereby a seal seat is formed;

creating an axially and circumferentially extending capture slot in the face of the nonrotating component;

attaching a retainer to the face so that the retainer cooperates with the face and the seal seat to define a circumferentially extending groove; and

installing a brush seal in the groove so that the bristles of the seal extend toward the rotating component to impede the flow of air through the gap;

the brush seal being radially retained by the capture slot and the seal seat and axially retained by the retaining ring and the face.

## COMMENTS

New Claims 21-31 represent the non-allowed claims from U.S. Serial No. 08/892,738 which do not include features related to the admission of cooling air into the barrel of the turbine engine in addition to that passing the brush seal. The claims which include this feature have been allowed. Claim 21 has been amended slightly by comparison to Claim 1. The only reference cited against the remaining claims was U.S. Patent 5,630,590 (the '590 Patent), issued May 20, 1997 to Joseph P. Bouchard and Merrell W. Long and assigned on its face to United Technologies Corporation. The '590 Patent was filed March 26, 1996.

The parent application to the subject application was filed as U.S. Serial Number 08/656,564 May 3, 1996.

Under 37 CFR 1.608(a) "When the effective filing date of an application is three months or less after the effective filing date of a patent, before an interference will be declared, either the applicant or applicant's attorney or agent of record shall file a statement alleging that there is a basis upon which the applicant is entitled to a judgment relative to the patentee. 37 CFR 1.607(a) provides that:

"(a) An applicant may seek to have an interference declared between an application and an unexpired patent by,

- (1) Identifying the patent,
- (2) Presenting a proposed count,
- (3) Identifying at least one claim in the patent corresponding to the proposed count,
- (4) Presenting at least one claim corresponding to the proposed count, and
- (5) Applying to the terms of any application claim,
  - (i) Identified as corresponding to the count, and

- (ii) Not previously in the application to the disclosure of the application.
- (6) Explaining how the requirements of 35 U.S.C. 135(b) are met, if the claim presented or identified under paragraph (a)(4) of this section was not present in the application until more than one year after the issue date of the patent."

Even a cursory review of the drawings of the '590 Patent and Applicant's drawings reveals that the invention claimed is the same.

It is proposed that an acceptable count for this interference is as follows.

#### COUNT

A gas turbine engine, the first component having at least one knife edge seal for inhibiting air leakage through an intercomponent gap between the first component and the second component, the first component characterized by a brush seal mounted on the first component in series with the knife edge seal, the bristles of the brush seal extending toward the second component for impeding the leakage of air through the inner-component gap.

This proposed Count is substantially Claim 1 of the '590 Patent, restated to cover gas turbines generally, rather than only refurbished gas turbines.

This Count is considered suitable to the Applicant. It is considered that Applicant's Claim 21 corresponds to this Count and claims each element recited in the Count. In Applicant's Claim 21, a stationary gas turbine engine is claimed. The engine includes a rotor having a cylindrical land region which corresponds to the second component in the '590 Patent and a stationary inner barrel downstream of the compressor which corresponds to the first component in the '590 Patent claim. Applicant's claim includes a labyrinth seal including at least one knife-edge seal and a brush seal, both of which are mounted on the first component for controlling passage of air between the two components. Accordingly, it is clear that all elements of the '590 Patent, Claim 1, are included in Applicant's Claim 21 as presently pending.

Applicant considers that the invention claimed in the '590 Patent is the same invention claimed in the subject application. Accordingly, it is believed clear that Applicant's claimed invention and that claimed in the '590 Patent are the same invention.

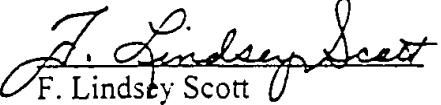
#### STATEMENT

It is considered that the subject application claims the same invention as the '590 Patent, as discussed above. Under 37 CFR 1.608(a), a statement by Applicant's attorney is required to initiate an interference when the effective filing date of an application is less than three months after the effective filing date of the patent. The subject application has an effective filing date of May 31, 1996 and the '590 Patent has an effective filing date of March 26, 1996--less than three months before the effective filing date of this application. Applicant's attorney hereby states that, upon investigation, there is a basis in Applicant's attorney's opinion, upon which the Applicant is entitled to a judgment relative to the patentee in an interference.

It is hereby respectfully requested that an interference be declared between the subject application and U.S. Patent 5,630,590.

Accordingly, it is respectfully requested that the Examiner determine that an interference should be declared and that the Examiner prepare and forward interference papers to the Board as provided in 37 CFR 1.609.

Respectfully submitted,

  
F. Lindsey Scott  
Registration No. 26,230  
Attorney for Applicant

c:\docs\arco\25200\prelim.amd